

WE CLAIM:

1. A method of determining the plane of a surgical patient's pelvis and inputting that plane into a computer via a tracking system, suitable for use in navigating partial or total hip replacement surgery, comprising the steps of:

aligning the patient in relation to a patient positioning frame with pelvic anatomical features of the patient disposed in secure mechanical relationship with corresponding patient-engaging features on said positioning frame;

acquiring with a tracking system the positions of a plurality of index points, said index points constrained to lie in a predetermined relationship with an anterior pelvic plane (APP) defined by the patient-engaging features on said positioning frame; and

defining a pelvic plane by calculation based upon the acquired positions of said index points and the predetermined relationship between said APP and said index points.

2. The method of Claim 1, wherein said patient engaging features comprise:

At least one feature adapted to engage an anterior superior iliac spine (ASIS); and

A feature adapted to engage a patient close to the pubic symphysis.

- 5 3. The method of Claim 2, wherein said step of acquiring with a tracking system the positions of a plurality of index points includes touching at least one of said index points with a trackable probe.
4. The method of claim 3, wherein said index points comprise at least three index points, three of said points defining a plane.
5. The method of Claim 3, wherein said index points define a coordinate system with known rotational relationship to said APP.
- 5 6. The method of Claim 1, wherein said step of aligning the patient in relation to a patient positioning frame comprises adjusting an adjustable portion of said frame in relation to said patient, with said adjustable portion of said positioning frame detached from an operating table .
- 5 7. The method of claim 6, wherein said step of aligning the patient in relation to a patient positioning frame further comprises adjusting said adjustable portion of said frame with the patient in either an upright or a supine position.

8. The method of Claim 7, comprising the further step of:

After adjusting said frame, relocating said patient onto an operating table;

5 Arranging said patient in the lateral decubitus position;

Clamping said patient securely between said adjustable portion of said frame on one side, and an opposing backrest on the other, to hold
10 said patient's pelvis in fixed position.

9. A pelvic locating frame, adapted to adjustably mount in opposition to an adjustable backrest, and suitable for use in connection with computer assisted surgery for finding the
5 orientation of a patient's pelvic plane, comprising:

at least one anterior superior iliac spine (ASIS) locating feature, adapted to engage in
10 close relation to the patient's ASIS;

at least one pubic locating feature, adapted to engage in close relation to the patient's pubic symphysis, said ASIS and pubic locating features defining an anterior pelvic
15 plane (APP); and

a group of index features, said group constrained to maintain a predetermined rotational relationship to said anterior pelvic plane (APP) defined by said ASIS and pubic
20 locating features.

10. The pelvic locating frame of claim 9, further comprising a rotatable mounting system mounting said pelvic locating frame, whereby said pelvic locating frame is capable of rotation about at least one axis.

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11. The pelvic locating frame of claim 10, wherein said rotatable mounting system is capable of rotation about two substantially perpendicular axes.

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12. The pelvic locating frame of claim 9, wherein said rotatable mounting system is adapted to allow engagement with two ASIS substantially vertically disposed, to accept a patient in a lateral decubitus position.

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13. The pelvic locating frame of claim 9, wherein said group of index features comprises a non-collinear set of at least three features, said set defining a coordinate system in predetermined rotational relationship with said APP.

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14. The pelvic locating frame of claim 13, wherein at least one of said index features comprises an indentation adapted to receive a complementary probe tip on a trackable probe.

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15. The pelvic locating frame of claim 13, wherein
said index features are constrained to move in
a predetermined, coordinated relationship with
said APP, so that the orientation of the APP
can be calculated from known positions of the
index features.

16. The pelvic locating frame of claim 15, wherein
said index features are carried on a rigid
plate;

And wherein said rigid plate is attachable to
said pelvic locating frame by an apparatus
which constrains the plate to rotate in concert
with said pelvic locating frame, locking the
coordinate system of the index features to the
APP.